PATENT

RECEIVED
SEP 06 2001
TECH CENTER 1600/2900

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Terry L. Gilton

Serial No.: 09/443,070

Filed: November 18, 1999

For: SEPARATION APPARATUS INCLUDING POROUS SILICON COLUMN

Examiner: G. Gabel

Group Art Unit: 1641

Attorney Docket No.:3530.2US (97-1257.2)

NOTICE OF EXPRESS MAILING
Express Mail Mailing Label Number: EL740536065US
Date of Deposit with USPS: August 31, 2001
Person making Deposit: Daniel Thatcher

RECEIVED
SEP 05 2001
BOARD OF PATENT APPEALS AND INTERFERENCES

BRIEF ON APPEAL

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Attention: Board of Patent Appeals and Interferences

Sirs:

09/06/2001 TSUGGS 00000005 09443070
01 FC:120 310.00 OP

This brief is submitted in TRIPLICATE pursuant to 37 C.F.R.§ 1.192(a) and in the format required by 37 C.F.R. § 1.192(c) and with the fee required by 37 C.F.R. § 1.17(c):

(1) REAL PARTY IN INTEREST

U.S. Serial No. 09/443,070, the patent application at issue in the above-referenced appeal, has been assigned to Micron Technology, Inc. ("Assignee"). The assignment has been recorded with the United States Patent & Trademark Office ("Office") at Reel No. 9551, Frame No. 0837. Accordingly, Micron Technology, Inc. is the real party in interest to the referenced appeal.

(2) RELATED APPEALS AND INTERFERENCES

Neither Appellant, Appellant's representative, nor Assignee is aware of any pending appeal or interference which would directly affect, be directly affected by, or have any bearing on the Board's decision in the present pending appeal.

(3) STATUS OF CLAIMS

Claims 1, 2, 8, and 12-31 are currently pending in the above-referenced patent application. Claims 1, 2, 8, and 12-31 stand rejected.

Claims 3-7 and 9-11 were previously cancelled without prejudice or disclaimer.

No claims have been allowed.

The rejections of claims 1, 2, 8, and 12-31 are being appealed.

(4) STATUS OF AMENDMENTS

Claims 1-29 were initially filed in the application. Claims 3-7 and 9-11 were cancelled, without prejudice, in response to the Office Action mailed on May 24, 2000.

The last amendment to the claims of the referenced patent application that was entered by the Office was filed by Appellant on February 8, 2001.

Claims 1, 2, 8, and 12-31 were rejected in the Final Office Action mailed on April 24, 2001.

On May 30, 2001, Appellant filed an Amendment Under 37 C.F.R. § 1.116 in response to the Final Office Action, wherein claims 1, 2, 8, and 12-31 were discussed in an effort to point out the patentability of the subject matter recited in each of these claims.

In an Advisory Action mailed on June 26, 2001, the rejections of claims 1, 2, 8, and 12-31 were renewed. The first sheet of the Advisory Action incorrectly states that claims 1, 2, 8, and 13-31 are rejected. However, the remainder of the Advisory Action correctly states that claims 1, 2, 8, and 12-31 are rejected. The Advisory Action states that Appellant's Response does not overcome the rejections.

A Notice of Appeal in the above-referenced application was mailed on July 2, 2001.

(5) SUMMARY OF THE INVENTION

The invention disclosed in the above-referenced application and recited in the claims thereof includes a method of substantially isolating a constituent of a sample. Page 20, lines 1-3. In the claimed method, the sample is dispersed in a mobile phase and applied to the first end of a

porous capillary column 14. Page 19, lines 17-27. The porous capillary column 14 is formed on a substrate 12, which is formed from silicon or other materials that can be treated to form porous regions. Page 10, lines 21-22; page 11, lines 1-3. Each substrate 12 may include multiple porous capillary columns 14 which are formed by patterning the substrate 12. Page 16, lines 3-7.

Each porous capillary column 14 further includes a matrix 16 that is made of porous silicon. Page 10, lines 22-23; page 11, lines 3-4. A capture substrate or stationary phase 117 is bound to the matrix 16 at a reaction region 120. Page 15, lines 26-30. The capture substrate of the claimed invention is an antibody, antigen, or any other substrate material that separates the constituent from the sample based on the capture substrate's affinity for the constituent. Page 15, lines 21-23.

After being applied to the column, the sample is drawn through the porous capillary column 14 by movement of the mobile phase. Page 20, lines 7-11. The sample may migrate by capillary action or with assistance from a migration facilitator 24, such as a pump, vacuum source, or electrical current generator. Page 13, line 18, to page 15, line 9. As the sample migrates through the porous capillary column 14, the constituents contained in the sample come into contact with the capture substrate 117. Page 21, lines 26-27. If one of the constituents has affinity for the capture substrate 117, the constituent will bind to the capture substrate 117, thereby isolating that constituent from the remainder of the sample. Page 21, line 27, to page 22, line 1. The constituents that do not have affinity for the capture substrate 117 continue to migrate through the porous capillary column 14. Page 21, line 27, to page 22, line 1.

A detector 22 or 122 detects the presence or absence of the constituent bound to the capture substrate 117. Page 22, lines 1-5. The detector 22 is located at the end of the capillary column or proximate to a reaction region 20 of each capillary column 14. Page 12, lines 16-17.

(6) ISSUES

A. Whether claims 1, 2, 8, and 12-31 contain new matter for reciting "said porous capillary column comprising a matrix including the same material as said nonporous substrate."

B. Whether United States Patent No. 5,482,598 issued to Isaka et al. ("Isaka") on January 9, 1996 teaches a capture substrate that substantially enhances separation of a constituent from a sample and, therefore, anticipates claims 1, 2, 8, 14-16, 18-20, 22-23, and 26-28 of the referenced patent application under 35 U.S.C. § 102.

C. Whether Isaka in view of United States Patent No. 5,536,382 issued to Sunzeri ("Sunzeri") on July 16, 1996 and United States Patent No. 5,571,410 issued to Swedberg et al. ("Swedberg") on November 5, 1996, teaches a method of substantially isolating a constituent of a sample that uses a capture substrate to enhance separation of the constituent from the sample and, therefore, renders claims 12, 13, 21, 24-25, and 30-31 obvious under 35 U.S.C. § 103(a).

D. Whether Isaka in view of United States Patent No. 5,882,496 issued to Northrup et al. ("Northrup") on March 16, 1999 teaches a method of substantially isolating a constituent of a sample that uses electrical current to separate the constituent and, therefore, render claims 17 and 29 obvious under 35 U.S.C. § 103(a).

(7) GROUPING OF CLAIMS

Group 1: Claims 1, 2, 8, 12-17, and 30:

Claims 1, 2, 8, 12-17, and 30 should be grouped together because claims 2, 8, 12-17, and 30 depend, directly or indirectly, on independent claim 1. Claims 1, 2, 8, 12-17, and 30 stand together. Claims 12, 13, 17, and 30 do not, however, fall with claim 1.

These claims recite the limitation of a "capture substrate" that "enhance[s] separation of the constituent from the sample."

Group 2: Claims 18-29 and 31:

Claims 18-29 and 31 should be grouped together because claims 19-29 and 31 depend, directly or indirectly, from independent claim 18. Claims 18-29 and 31 stand together, but claims 19-21, 24, 25, and 31 do not fall with claim 18.

These claims recite the limitation of a "stationary phase disposed at a selected location along said capillary column."

(8) ARGUMENT

A. Rejections under 35 U.S.C. § 112

Claims 1, 2, 8, and 12-31 were rejected under the first paragraph of 35 U.S.C. § 112, which provides:

> [t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 2, 8, and 12-31 were rejected "as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s), at the time the application was filed, had possession of the claimed invention." Advisory Action, page 2. Specifically, the Office asserted that the specification does not provide literal support for the recitation of "said porous capillary column comprising a matrix including the same material as said nonporous substrate" and that, therefore, this limitation constituted new matter. Office Action of April 24, 2001, page 3.

Appellant respectfully traverses this rejection. The as-filed application states that the sample separation apparatus 10 of the claimed invention comprises a nonporous substrate 12 and porous capillary columns 14. Page 10, lines 21-22. The porous capillary columns 14 comprise a matrix 16 and pores 18 formed through the matrix. Page 10, lines 22-23. The substrate 12 is formed from silicon or any other materials that can be treated to form porous regions, such as the porous capillary columns 14. Page 11, lines 1-3. Stated another way, the material used in both the substrate 12 and porous capillary columns 14 is silicon. The only difference between the

substrate 12 and the porous capillary columns 14 is that the silicon of the latter is treated to make it porous. Since the porous capillary columns 14 are formed of silicon, the matrix 16, which comprises the porous capillary columns 14, is also formed from silicon. Therefore, both the substrate 12 and matrix 16 are formed from the same material, namely silicon.

Since the as-filed application provides support for the limitation "said porous capillary column comprising a matrix including the same material as said nonporous substrate, " Appellant respectfully requests that the § 112, first paragraph, rejection of claims 1, 2, 8, and 12-31 be reversed.

B. Rejections under 35 U.S.C. § 102(b)

Claims 1, 2, 8, 14-16, 18-20, 22-23, and 26-28 were rejected under 35 U.S.C. § 102(b) as being anticipated by Isaka. 35 U.S.C. § 102(b) provides that:

> A person shall be entitled to a patent unless-
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

1. Isaka does not anticipate the claimed invention because it does not set forth every element of the claims.

Appellant respectfully traverses the anticipation rejection of claims 1, 2, 8, 14-16, 18-20, 22-23, and 26-28 because Isaka does not expressly or inherently set forth each element of the claims. For example, claim 1 recites a method of substantially isolating a constituent of a sample that includes dispersing the sample in mobile phase; applying the sample to a column formed in a nonporous substrate where the column is comprised of a matrix formed from the same material as the substrate and a capture substrate; and drawing the sample across the column to enhance separation of the constituent from the sample by a capture substrate.

It is respectfully submitted that Isaka does not expressly or inherently disclose the limitation of "drawing the sample across a flowfront through said porous capillary column so as to enhance separation of the constituent from the sample by said at least one capture substrate."

Isaka discloses a microchannel element and a method of manufacturing the microchannel element. The microchannel element includes a microchannel 9 that is formed on a surface of a semiconductor substrate 1. Column 2, lines 46-54. The microchannel element is used for solid-gas and solid-liquid separation, and also may apply to an enzyme reaction using adsorptivity. Column 3, lines 1-5. Isaka discloses that an enzyme, such as invertase or uricase, can be immobilized in the microchannel to carry out various reactions. Column 3, lines 1-5.

As known in the art, enzymes are proteins that function as biological catalysts. Each enzyme has affinity for a specific substrate and catalyzes a reaction of that substrate into a specific product. Stated another way, the enzyme converts the enzymatic substrate into a product

that is a different compound than the enzymatic substrate. After the reaction is complete, substantially all of the enzymatic substrate has been converted into the product. Enzymatic reactions are commonly used to determine the amount of enzymatic substrate or product present in a sample. In addition, enzymatic reactions are commonly used in situations where the product is easier to detect than the enzymatic substrate. The amount of enzymatic substrate present in a sample can be extrapolated by determining the amount of product that forms as a result of the reaction.

The enzymes disclosed in Isaka are used in precisely this way. Therefore, the enzymes do not "enhance separation of the constituent from the sample" and are not "capture substrates" as defined in the claimed invention. In the invertase example, saccharose is the "sample" that is applied to the microchannel. The invertase, which is immobilized on the microchannel, catalyzes the conversion of saccharose into its hydrolysis product. Isaka does not disclose that this sample of saccharose contains or may contain other constituents. In fact, if the sample did contain other constituents, it would significantly reduce the yield of the desired reaction product. Since saccharose is the only constituent in the sample, there are no other constituents from which the saccharose may be separated. In addition, since the saccharose is the substrate with which the enzyme (invertase) reacts, the saccharose will no longer be present after the reaction because it will be converted into the hydrolysis product by the invertase. Therefore, the invertase does not enhance separation of a constituent from a sample and is not a capture substrate as recited by the claimed invention.

In the uricase example, serum is the "sample" applied to the microchannel element and uric acid is the analyte to be detected. Isaka discloses that uricase can be used to check how much uric acid is present in the serum. The Office states that this "checking" involves capturing and detecting the uric acid in the serum. However, the uricase is not capturing the uric acid because the uric acid only interacts briefly with the enzyme, just long enough for the uric acid to be converted into the product of the enzymatic reaction. The uric acid can not be the constituent that is separated from the serum (sample) by the uricase (capture substrate) because the uric acid is converted into a different product. Therefore, uricase is not a capture substrate as defined by the claimed invention and does not enhance separation of the uric acid from serum.

Since the enzymes do not "enhance separation of the constituent from the sample" and are not "capture substrates" as defined in the present invention, Appellant respectfully submits that claim 1 is not anticipated by Isaka. Isaka does not set forth the claim limitation of "drawing the sample across a flowfront through said porous capillary column so as to enhance separation of the constituent from the sample by said at least one capture substrate" and, therefore, Appellant respectfully requests that the anticipation rejection to claim 1 be reversed.

Claims 2, 8, 14-16, 17, and 30 are each allowable as depending, either directly or indirectly, from claim 1, which is allowable. Accordingly, it is also requested that the rejections under 35 U.S.C. § 102(b) of each of these claims be reversed.

Claim 12 is further allowable because Isaka does not expressly or inherently disclose that the capture substrate is an antibody.

Claim 13 is further allowable because Isaka does not expressly or inherently disclose that the capture substrate is an antigen.

Claim 17 is also allowable because Isaka does not expressly or inherently disclose applying an electrical current across a length of the capillary column.

Claim 30 is further allowable because Isaka does not expressly or inherently disclose that the capture substrate is at least one of an antibody and an antigen.

Claim 18 recites a method of identifying a constituent in a sample. The steps of the method include "applying the sample to a first end of a capillary column formed in a nonporous substrate, said capillary column comprising a matrix including the same material as said nonporous substrate," "drawing the sample across a flowfront through said capillary column and in contact with a stationary phase disposed at a selected location along said capillary column," and "detecting binding of the constituent with said stationary phase at said selected location."

Isaka does not expressly or inherently disclose the limitations in claim 18 of "drawing the sample across a flowfront through said capillary column and in contact with a stationary phase disposed at a selected location along said capillary column" and "detecting binding of the constituent with said stationary phase at said location." First, the enzymes disclosed in Isaka are not "stationary phases" for the reasons detailed above explaining that the enzymes are not "capture substrates." Specifically, the as-filed application equates the terms "capture substrate" and "stationary phase." Page 15, lines 19-21. In addition, Isaka does not expressly or inherently disclose that the enzymes are disposed at a selected location along the capillary column. Isaka merely states that the "enzyme is immobilized in the porous channel" but does not limit the

location to a specific section of the microchannel. Column 3, lines 6-8. With regard to the second claim limitation, Isaka does not disclose, either expressly or inherently, that the constituent bound to the stationary phase is the species that is detected. In fact, Isaka states that the uric acid, which as discussed above is not the constituent, is the species that is detected.

Since Isaka does not expressly or inherently disclose all the claim limitations of claim 18, Appellant respectfully requests that the anticipation rejection of claim 18 be reversed. It is also requested that the 35 U.S.C. § 102(b) rejections of claims 19, 20, 22-23, 26-28, and 31 be reversed, as each of these claims is allowable as depending, directly or indirectly, from allowable claim 18.

Further, claim 19 is allowable because Isaka does not disclose that a detection reagent is applied to a selected location and then analyzed to determine if the constituent is present. The immobilized enzyme of Isaka can not be the detection reagent that is applied to the selected location because the enzyme is asserted by the Office to be the stationary phase.

Claim 20 is further allowable because Isaka does not disclose that the step of analyzing is performed by quantifying a change in the detection reagent.

Claim 21 is further allowable because Isaka does not disclose that the step of detecting is determined by an electrical characteristic and comparing that characteristic to the characteristic of a control.

Claim 24 is further allowable because Isaka does not disclose that the stationary phase is an antibody.

Claim 25 is further allowable because Isaka does not disclose that the stationary phase is an antigen.

Claim 31 is further allowable because Isaka does not disclose that the capture substrate is at least one of an antibody and an antigen.

C. Rejection of claims 12, 13, 21, 24, 25, 30, and 31 under 35 U.S.C. § 103(a)

Claims 12, 13, 21, 24, 25, 30, and 31 were rejected under 35 U.S.C. § 103(a), which provides that :

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The Office bears the substantial burden of establishing a *prima facie* case of obviousness. M.P.E.P. § 706.02(j) states that:

> [t]o establish a *prima facie* case of obviousness, three basic criteria must be met. **First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings**. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 U.S.P.Q. 1438 (Fed. Cir. 1991) (emphasis added).

1. The claimed invention is nonobvious over Isaka, Sunzeri, and Swedberg because there is no motivation to combine the references.

Claims 12, 13, 21, 24, 25, 30, and 31 were rejected as being rendered obvious by the combination of Isaka in view of Sunzeri and Swedberg. Appellant respectfully traverses this rejection.

In order to "support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Office must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).

The teachings of Isaka were discussed previously.

Sunzeri teaches a method for analyzing the constituents of human biological fluids. Column 2, lines 36-37. A labeled specific binding pair member is added to a human biological fluid to effect binding between an analyte in the human biological fluid and the specific binding pair member. Column 2, lines 37-39. The constituents of the human biological fluid, including complexes of the analyte and the specific binding pair member, are separated by way of known capillary electrophoresis techniques. Column 4, lines 1-4. The separation obtained by way of capillary electrophoresis is then compared to a control, which provides a standard for quantitation by indicating the position where the analyte would have been present if it had not been bound by the labeled specific binding pair member. Column 9, lines 5-47. The specific

binding pair member is not immobilized to the matrix of the capillary electrophoresis substrate, but rather is permitted to migrate through the matrix with the bound analyte.

Swedberg discloses a miniaturized column device that is formed by laser ablating a substrate. Column 13, lines 46-48. The substrate is "any material which is UV-adsorbing, capable of being laser-ablated and which is not silicon or a silicon dioxide material such as quartz, fused silica or glass." Column 7, lines 53-56. These materials include laser ablatable polymers, ceramics, and laminates. Column 7, lines 57-64. These materials are used to avoid "the problems encountered in prior devices formed in silicon or silicon dioxide-based materials. Such problems include the inherent chemical activity and pH instability of silicon and silicon dioxide-based substrates." Column 21, lines 43-48.

Swedberg also teaches a miniaturized separation apparatus including a column within which a porous, biocompatible material, such as nylon, cellulose, polymethylmethacrylate, polyacrylamide, or agarose, may be disposed. Col. 27, lines 37-40. This biocompatible material is placed in a sample flow component and serves as a filter. Column 27, lines 33-43. The sample flow component can also serve a capture function by using an affinity chromatography matrix, such as a biological affiant, antibody, lectin, enzyme substrate, enzyme or inhibitor. Column 27, lines 43-55.

The Office states that it would have been obvious to "modify the capture substrate in the chromatographic separation apparatus taught by Isaka to include other capture species such as antigens and antibodies, such as taught in the affinity chromatographic matrix of Swedberg in

order to achieve enhanced simultaneous performance of separation, filtration, and capture function in a single chromatographic device." Advisory Action, page 7.

It is respectfully submitted that none of Isaka, Sunzeri, Swedberg, or the knowledge generally available to one of ordinary skill in the art provide a motivation to combine the references to establish a *prima facie* case of obviousness. As discussed in the 35 U.S.C. § 102(b) rejections, Isaka does not teach or suggest a capture substrate that enhances the separation of a constituent from a sample. Rather, Isaka discloses a microchannel element that uses invertase or uricase immobilized in the channel to catalyze a reaction or to detect the amount of a specific molecule.

The teachings of Sunzeri and Swedberg also do not provide the motivation or suggestion to combine the references to produce the claimed invention. As acknowledged by the Office, Sunzeri is only incorporated for the teaching of using internal and external standards or controls alongside sample analysis in capillary electrophoresis. Advisory Action, page 7. Nothing in Sunzeri would suggest to a person of ordinary skill in the art to use a capture substrate that enhances the separation of a constituent from a sample. Furthermore, Swedberg does not provide the requisite motivation because its separation device discloses a column or open trench that is filled with a different material than the material from which the substrate of the separation device is formed. As mentioned above, the substrate of the separation device is non-silicon based material while the trench is filled with a porous, biocompatible media. Nothing in Swedberg would suggest to a person of ordinary skill in the art to use a capture substrate that enhances the

separation of a constituent from a sample and to use the same materials to form the substrate and matrix.

In addition to the above-mentioned reasons, Appellant respectfully submits that "[i]t is improper to combine references where the references teach away from the combination." M.P.E.P. § 2145. See also *In re Grasselli*, 713 F.2d 731, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983). Swedberg teaches away from the combination of references because Swedberg uses a separation device substrate and columns that are not formed from silicon or silicon dioxide-based material. Swedberg does not use these materials because of their purportedly inherent chemical activity and pH instability. In contrast, Isaka discloses that its substrate is formed from silicon and does not provide any suggestion or motivation that its teachings are applicable to non-silicon substrates. Therefore, a person of ordinary skill in the art would not be motivated to combine the teachings of Isaka and Swedberg to produce the claimed invention because Swedberg teaches away from using silicon as a substrate.

Neither Sunzeri nor Isaka remedy this teaching away by Swedberg. As acknowledged by the Office, Sunzeri is only incorporated for the teaching of using internal and external standards or controls alongside sample analysis in capillary electrophoresis. Advisory Action, page 7. Furthermore, since Isaka teaches a microchannel formed on a silicon based semiconductor substrate, there is no motivation for one of ordinary skill in the art to combine Isaka with the teachings of Swedberg.

Swedberg further teaches away from combining the references because it discloses that the column and substrate are formed from different materials. The substrate in Swedberg is a

laser ablatable polymer, ceramic, or laminate, while the column is filled with a biocompatible material or an affinity chromatography matrix. Since these materials are different from each other, the combination of Swedberg with Isaka and Sunzeri would not produce the claimed invention because the substrate and matrix of the resulting device would be comprised of different materials.

Furthermore, based on the manner in which the teachings of these references have been combined, the motivation to make the asserted combination could only have been based on improper hindsight provided by the disclosure or claims of the above-referenced application.

Finally, the nonobviousness of independent claims 1 and 18 precludes the rejections of claims 12, 13, and 30, which depend from claim 1, and of claims 21, 24, 25, and 31, which depend from claim 18, because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine,* 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988); *see also* M.P.E.P. § 2143.03.

In summary, a *prima facie* case of obviousness has not been established because no suggestion or motivation to combine exists in Isaka, Sunzeri, and Swedberg. In addition, Swedberg teaches away from combining the references because it discloses using a non-silicon based material for its substrate. Finally, these claims are improperly rejected because they depend from independent claims that are allowable. For these reasons, Appellant respectfully requests that the rejection of claims 12, 13, 21, 24, 25, 30, and 31 be reversed.

D. Rejection of claims 17 and 29 under 35 U.S.C. § 103(a)

Claims 17 and 29 were rejected under 35 U.S.C. § 103(a).

1. Claims 17 and 29 are nonobvious over Isaka and Northrup because they depend from claims that are otherwise allowable.

Claims 17 and 29 were rejected as being unpatentable over Isaka in view of Northrup. Appellant respectfully traverses this rejection.

Northrup discloses, among several other things, a electrophoretic separation device that includes porous columns formed internally within a silicon substrate. Electrodes are positioned at opposite ends of the substrate so as to facilitate the movement of the constituents of a sample along the lengths of the columns. Northrup also discloses methods for fabricating such an electrophoretic separation device.

Claims 17 and 29 are allowable as depending, respectively, from allowable claims 1 and 18. Claim 17 depends from claim 1 and, therefore, includes all the limitations in claim 1. Since Northrup does not disclose these limitations, such as a capture substrate that enhances separation of a constituent from a sample, claim 1 is nonobvious over Isaka in view of Northrup. The nonobviousness of independent claim 1 precludes the rejection of claim 17 because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine,* 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988); *see also* M.P.E.P. § 2143.03.

Similarly, Claim 29 depends from claim 18 and, therefore, includes all the limitations in that claim. Since Northrup does not disclose these other limitations, claim 18 is nonobvious over Isaka in view of Northrup. The nonobviousness of independent claim 18 precludes the rejection

of claim 29 because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine,* 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988); *see also* M.P.E.P. § 2143.03.

(9) APPENDICES

A copy of claims 1, 2, 8, and 12-31 as presently amended is appended hereto as "Appendix A."

(10) CONCLUSION

Appellant respectfully submits that claims 1, 2, 8, and 12-31 are allowable for the reasons summarized below.

A. Appellant respectfully submits that claims 1, 2, 8, and 12-31 are allowable because they do not contain new matter. Specifically, the as-filed application provides support for the claim limitation "said porous capillary column comprising a matrix including the same material as said nonporous substrate."

B. It is respectfully submitted that Isaka does not anticipate claims 1, 2, 8, 14-16, 18-20, 22-23, and 26-28 because Isaka does not disclose all the limitations of the claimed invention. Specifically, Isaka does not disclose a capture substrate that is used to enhance separation of a constituent from a sample.

C. Appellant respectfully submits that the combination of Isaka, Sunzeri, and Swedberg does not render claims 12, 13, 21, 24-25, and 30-31 obvious because there is no motivation to

combine the references to produce the claimed invention. In addition, Swedberg teaches away from the proposed combination. Finally, claims 12, 13, 21, 24-25, and 30-31 depend from independent claims that are otherwise allowable.

D. Appellant respectfully submits that Isaka and Northrup do not render claims 17 and 29 obvious because those claims depend from independent claims that are otherwise allowable.

Respectfully submitted,

Brick G. Power
Registration No. 38,581
Attorney for Appellant
TRASKBRITT, P.C.
Salt Lake City, Utah 84110-2550
Telephone: (801) 532-1922

BGP/jml
Date: August 31, 2001

N:\2269\3530.2\Brief on Appeal.wpd 8/31/01

APPENDIX A

1. A method of substantially isolating a constituent of a sample, comprising:

dispersing the sample in a mobile phase;

applying the sample to a first end of a porous capillary column formed in a nonporous substrate, said porous capillary column comprising a matrix including the same material as said nonporous substrate and at least one capture substrate disposed on said matrix; and

drawing the sample across a flowfront through said porous capillary column so as to enhance separation of the constituent from the sample by said at least one capture substrate.

2. The method of claim 1, further comprising detecting the constituent with at least one detector disposed proximate a detecting region of said capillary column.

8. The method of claim 1, wherein said dispersing comprises dissolving the sample in a liquid mobile phase.

12. The method of claim 1, wherein said applying comprises applying the sample to said porous capillary column with said at least one capture substrate comprising an antibody.

13. The method of claim 1, wherein said applying comprises applying the sample to said porous capillary column with said at least one capture substrate comprising an antigen.

14. The method of claim 1, further comprising applying a differential pressure to said capillary column to effect said drawing.

15. The method of claim 1, wherein said drawing occurs without applying differential pressure to said capillary column.

16. The method of claim 15, wherein said drawing comprises capillary action induced by said matrix.

17. The method of claim 1, wherein said drawing comprises applying an electrical current across a length of said capillary column.

18. A method of identifying the presence of a constituent in a sample, comprising:
providing the sample in a mobile phase;
applying the sample to a first end of a capillary column formed in a nonporous substrate, said capillary column comprising a matrix including the same material as said nonporous substrate;
drawing the sample across a flowfront through said capillary column and in contact with a stationary phase disposed at a selected location along said capillary column; and
detecting binding of the constituent with said stationary phase at said selected location.

19. The method of claim 18, wherein said detecting comprises applying a detection reagent to at least said selected location and analyzing said detection reagent to determine whether the constituent is present.

20. The method of claim 19, wherein said analyzing comprises quantifying a change in said detection reagent.

21. The method of claim 18, wherein said detecting comprises determining an electrical characteristic of said selected location and comparing said electrical characteristic to an electrical characteristic of a control.

22. The method of claim 18, further comprising applying said stationary phase to said matrix.

23. The method of claim 22, wherein said applying said stationary phase is effected before said applying the sample.

24. The method of claim 18, wherein said applying comprises applying the sample to said capillary column with said stationary phase comprising an antibody.

25. The method of claim 18, wherein said applying comprises applying the sample to said capillary column with said stationary phase comprising an antigen.

26. The method of claim 18, further comprising applying a differential pressure to said capillary column to effect said drawing.

27. The method of claim 18, wherein said drawing occurs without applying differential pressure to said capillary column.

28. The method of claim 27, wherein said drawing comprises capillary action induced by said matrix.

29. The method of claim 18, wherein said drawing comprises applying an electrical current across a length of said capillary column.

30. The method of claim 1, wherein said applying comprises applying the sample to said porous capillary column with said at least one capture substrate comprising at least one of an antibody and an antigen.

31. The method of claim 18, wherein said applying the sample comprises applying the sample to said capillary column with said stationary phase comprising at least one of an antibody and an antigen.